

## THE CLAIMS

What is claimed is:

1. A golf ball comprising:
  - 5 a center formed of a reaction product having a loss tangent of less than about 0.1 at -50°C comprising:
    - polybutadiene having a molecular weight of greater than about 200,000;
    - 10 a crosslinking material present in an amount of about 10 to about 40 parts per hundred of the reaction product;
    - a free radical source present in an amount of about 0.1 to about 15 parts per hundred of the reaction product;
    - 15 a cis-to-trans catalyst present in an amount of about 0.1 to about 10 parts per hundred of the reaction product; and
    - a cover comprising a thermoplastic or thermoset polyurethane.
- 15 2. The golf ball of claim 1, wherein the loss tangent is less than about 0.07 at -50°C.
3. The golf ball of claim 1, wherein the polybutadiene has a resilience index of about 40 or greater.
- 20 4. The golf ball of claim 3, wherein the resilience index is greater than about 50.
5. The golf ball of claim 1, wherein the molecular weight of the polybutadiene is greater than about 250,000.
- 25 6. The golf ball of claim 5, wherein the molecular weight of the polybutadiene is from about 300,000 to about 500,000.
7. The golf ball of claim 1, wherein the cis-to-trans catalyst comprises at least one of an organosulfur compound, an aromatic organic compound, or a mixture thereof.
- 30 8. The golf ball of claim 7, wherein the organosulfur compound comprises metal.

9. The golf ball of claim 7, wherein the organosulfur compound is substantially free of metal.
10. The golf ball of claim 7, wherein the aromatic organic compound comprises a hydroxy group, a metal salt of a hydroxyl, a mercapto group, a metal salt of a mercapto group, a carboxy group, a metal salt of a carboxyl, an acrylate, a metal salt of an acrylate, or a combination thereof.
11. The golf ball of claim 7, wherein the aromatic organic compound is substantially free of metal.
12. A golf ball comprising:  
a center formed of a reaction product having a dynamic stiffness of less than about 50,000 N/m at -50°C and a loss tangent of less than about 0.1 at -50°C,  
wherein the reaction product comprises:  
polybutadiene having a molecular weight of greater than about 200,000;  
a crosslinking material present in an amount of about 10 to about 40 parts per hundred of the reaction product;  
a free radical source present in an amount of about 0.1 to about 15 parts per hundred of the reaction product;  
a cis-to-trans catalyst present in an amount of about 0.1 to about 10 parts per hundred of the reaction product; and  
a cover comprising a castable reactive liquid material.
13. The golf ball of claim 12, wherein the dynamic stiffness is about 10,000 N/m to about 40,000 N/m at -50°C.
14. The golf ball of claim 13, wherein the dynamic stiffness is about 20,000 N/m to about 30,000 N/m at -50°C.
15. The golf ball of claim 12, wherein the loss tangent is less than about 0.07 at -50°C.
16. The golf ball of claim 12, wherein the castable reactive liquid material comprises polyurethane.

17. The golf ball of claim 12, wherein the center has an outer diameter of about 1.55 inches or greater.